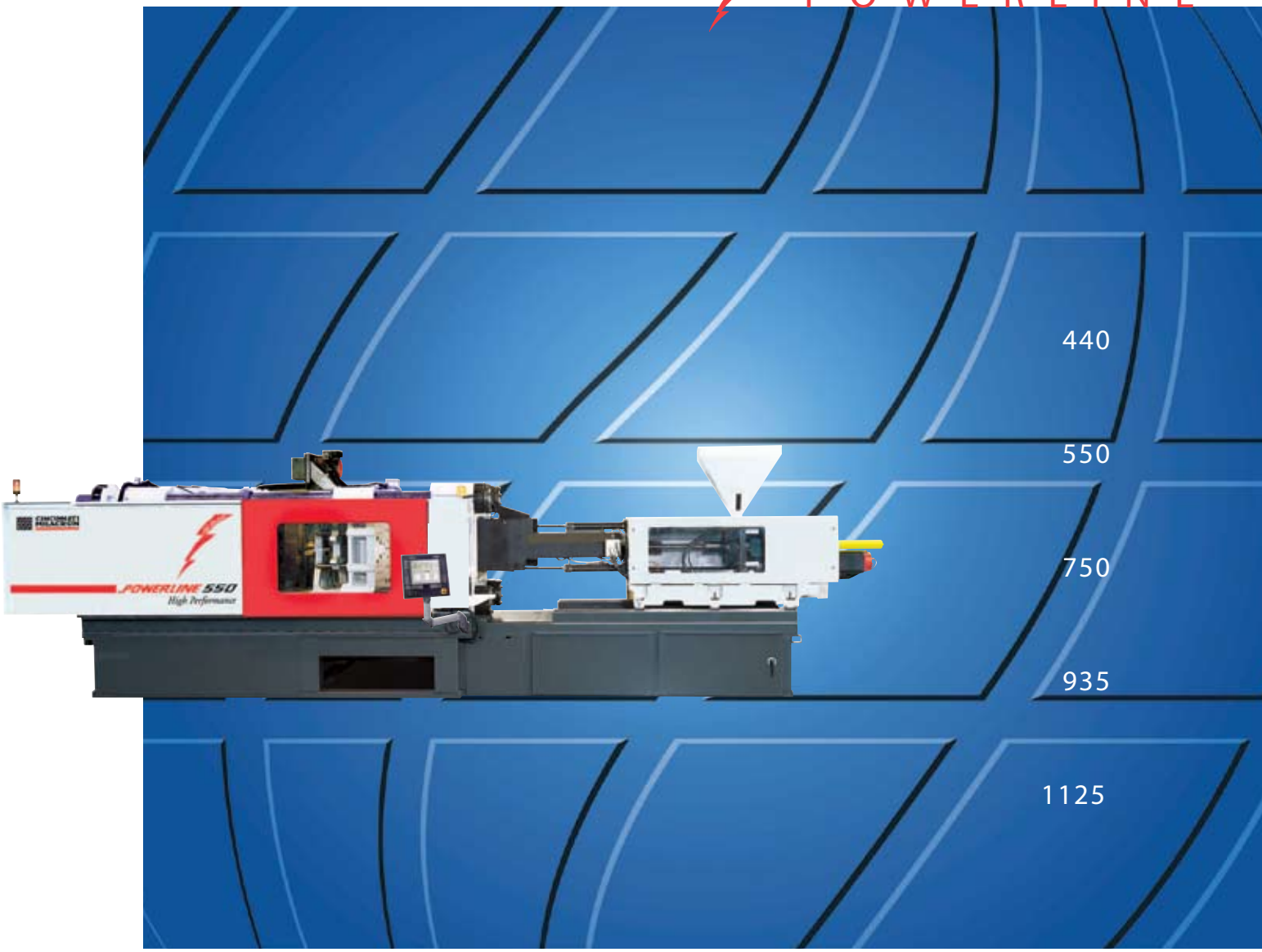
FEATURES AND BENEFITS

POWERLINE



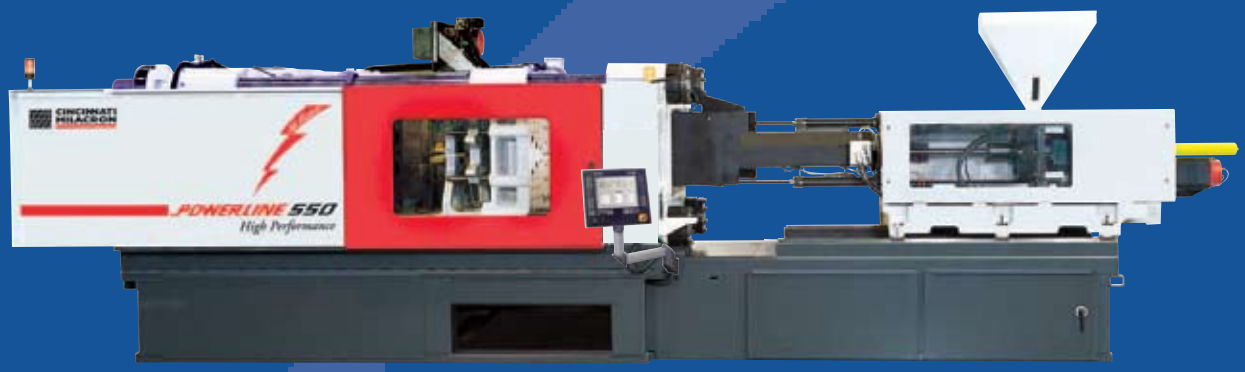
NEXT GENERATION ALL-ELECTRIC INJECTION MOLDING MACHINES

CINCINNATI MILACRON

NEXT GENERATION

POWERLINE

THE MOST PRODUCTIVE ALL-ELECTRIC MACHINE IN THE INDUSTRY



POWERLINE All-Electric Injection Molding by Milacron. Simpler, faster, cleaner, quieter. With operator-friendly patented-technology MOSAIC Control. Exclusive MOLDGUARD Mold-Protect Software standard on all models. And SIDEWINDER Two-stage Injection Unit standard on models 440 and up.

CINCINNATI MILACRON

PERFORMANCE

- MOLDGAURD Proprietary Full-Stroke Mold Protection
- Exclusive rack-and-pinion drives
- Unique roller screw injection and ejection operation
- SIDEWINDER Two-Stage Injection Unit standard on larger tonnage models
- MOSAIC Control standard

SIMPLE, PRODUCTIVE, ECONOMICAL

MILACRON is the No. 1 name in plastics technologies worldwide. POWERLINE is the No. 1 name in All-Electric Injection Molding industry wide. Put the two together and you have the No. 1 combination for injection molding productivity - and processing profitability - today.

THE SIMPLER ALL-ELECTRIC MACHINE

POWERLINE is designed and engineered to be a simpler machine. Fewer components. Higher performing components. Like rack and pinion drives. Roller screws. Bull gears. Computer-technology replacements for all hydraulics. This means longevity, durability and dependability in a "simpler" production unit.

THE MORE PRODUCTIVE ALL-ELECTRIC MACHINE

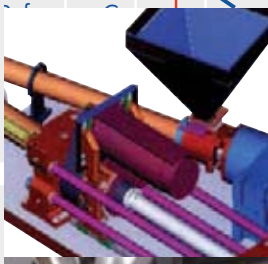
POWERLINE has taken All-Electric productivity to new levels. High-speed features like DSP/Digital Signal Processing. MOLDGUARD closure at full speeds with full mold protection. Intelligent Auto-Ramping on clamp. SIDEWINDER Two-Stage Injection Unit on larger tonnage models. Mean faster speeds. Greatly reduced cycle times. Higher productivity.

THE CLEANER, GREENER ALL-ELECTRIC MACHINE

All-Electric operation. Fully-mechanical powertrain. No hydraulic systems. No hydraulic system losses. Only clean, quiet environmentally friendly injection molding. With 50% - 90% savings in energy usage over comparable tonnage hydraulic machines.

THE MORE ECONOMICAL ALL-ELECTRIC MACHINE.

Increased energy savings. Greater energy cost savings. Higher speeds. Reduced cycle times. Drastic reductions in hydraulic parts. Replaced by advanced computer systems with advanced capabilities like our patented-technology computer-based MOSAIC Control systems. It all adds up to greater R-O-IMMI. Greater Return-On-Injection Molding Machine Investment. POWERLINE means higher productivity - higher profitability - for you.



FEATURES

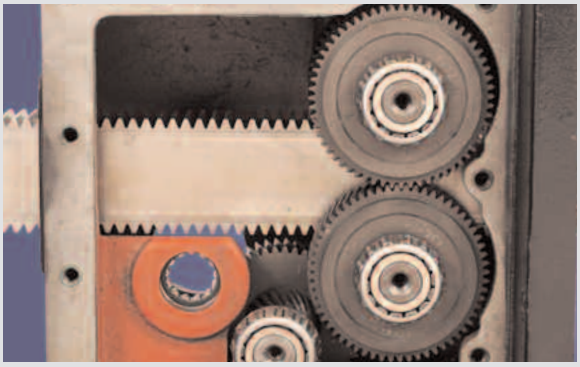
- "Sight Window" in guards over injection unit
- Low inertia air cooled AC servo motors
- Digital drives
- High power factor, no need for power factor correction
- Color feeder, software and signals only
- Eject retract limit switch verification
- Floppy disk drive
- Flow mold
- Hydraulic fully programmable core, one or more cores (software/signals only)
- Insert molding
- Mold gate, pneumatic (software/signals only)
- SPI robot interface 3.0 (software/signals only)
- Three stage air eject (software/signals only)
- Coining

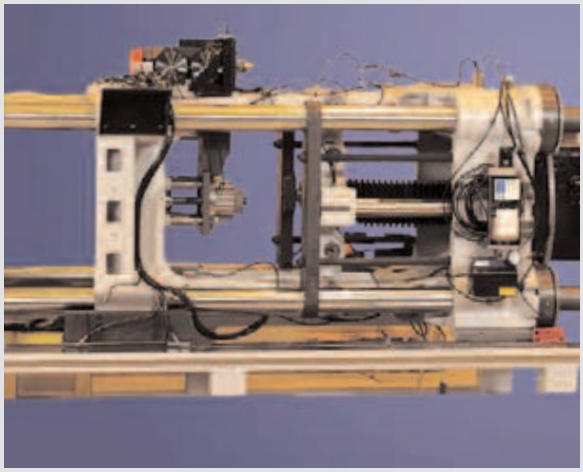
POWERLINE

CLAMP

POWERLINE'S clamp unit is recognized as one of the most durable in the industry. Faster clamp speeds, shorter cycle times, increased productivity and processing profitability are all hallmarks of POWERLINE clamp performance features.

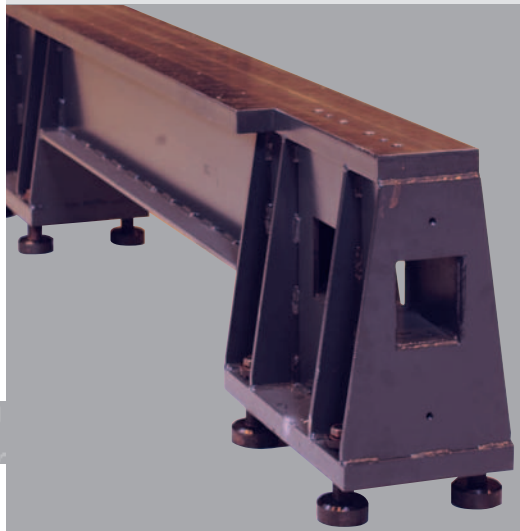
- Rack and pinion clamp drive
- Eight pin double shear clamp
- Replaceable die locating ring
- Adjustable moving platen supports on hardened steel ways
- Hardened steel toggle pins and reduced lubrication bushings
- Clamp lubrication alarms
- Automatic electrically activated die height adjustment





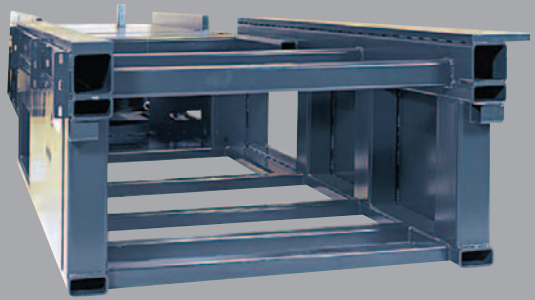
POWERLINE'S CLAMP ASSEMBLY

POWERLINE'S Rack And Pinion powertrain was selected because of its ability to perform in adverse conditions with minimal wear in the fastest cycle times. The rack and pinion lubrication system is not stroke dependent as other systems are. The POWERLINE rack is 100% lubricated in the usable stroke every cycle. The pinion system reduces backlash potential and accelerates faster than a ball screw or hydraulically power-driven system. The motor mounts directly to the gearbox, eliminating the need for belts and pulleys.



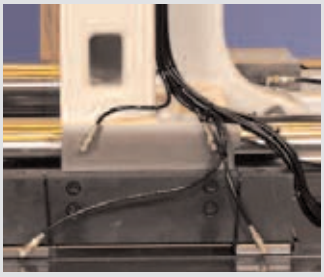
BASE

Tubular steel base or I-beam base for maximum rigidity. Both base designs provide tri-directional parts removal.



RACK AND PINION POWERTRAIN

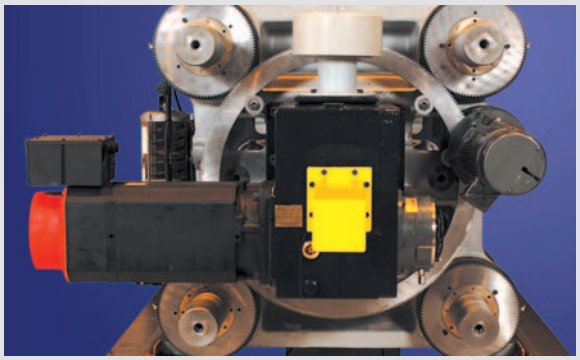
POWERLINE'S SKATES



Faster, more durable skates distribute load evenly and at lower forces due to the large bearing surface. The shoe extends past the face of the moving platen and past the rear moving platen bushing to reduce platen tipping with large mold weights, which reduces mold wear and moving platen bushing wear. The extended shoe gives the clamp the capability to run at high speeds for years to come.

BUSHINGS

Graphite-impregnated bronze bushings reduce the lubrication and maintenance required, while increasing the life of the bushing. The graphite impregnation retains grease over a long period of time ensuring low frictional forces. The reduction of heat increases the bushing life which ultimately keeps the platens parallel and reduces long term mold wear.



BULL GEAR

Bull Gear provides uncompromised die height adjust. Note direct mounted AC Servo Motor to rack and pinion.

RUBBER NUTS

Rubber Nut casting reduces wear while rotating. The bronze casting's sliding surface provides less friction over steel components as you change die height size. The casting is beveled to give rubber nut effect: beveled edge allows tonnage forces to be distributed evenly across all threads of the nut, extending the life of your machine's components.

POWER CABINET

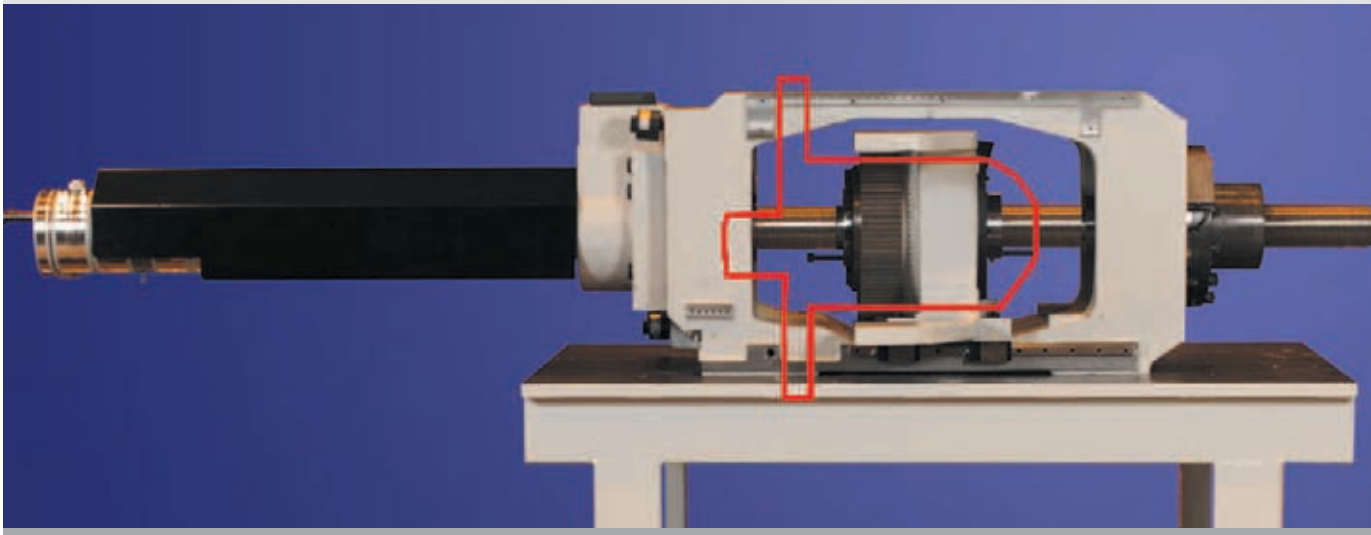
Power cabinet is totally enclosed and isolated from from plant atmosphere, reducing the amount of airborne contaminants that can settle on drives and electrical components.This increases the life of electrical components and helps avoid power failures. Base mounted fans pull air in through the cabinet, cooling heat sinks so drives can be enclosed safely.

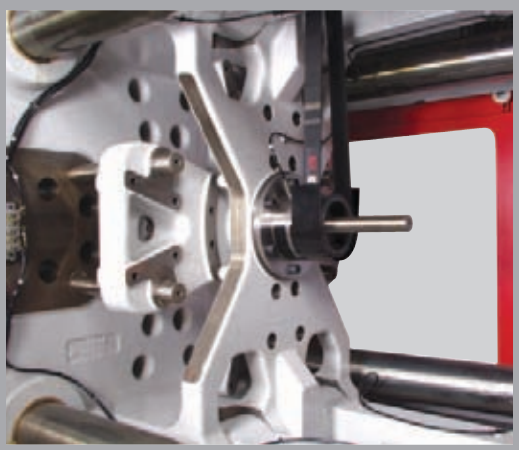
POWERLINE

INJECTION

POWERLINE'S Injection Unit offers smooth, simple, faster operation with low wear and low maintenance features. POWERLINE's reciprocating injection unit, in fact, features a 50% reduction in component parts from traditional ball screw design. This means far less maintenance, wear, repair and replacement. POWERLINE's reciprocating injection unit includes interchangeable A', A, B, C barrel sizes. Note position (outlined in red) of AC Servo motor for easy, convenient access. SIDEWINDER Two-Stage Injection Unit is standard on 440 ton models and up for increased capacity and versatility.

- Low inertia pulleys
- Laser aligned assembly procedure
- Air bearing for easy injection unit swivel
- Twin pull-in cylinders
- Hopper slide shutoff with discharge chute
- Precision ground linear bearing sled carriage
- Ball check or slider ring
- Injection before tonnage (Pre-Inject)

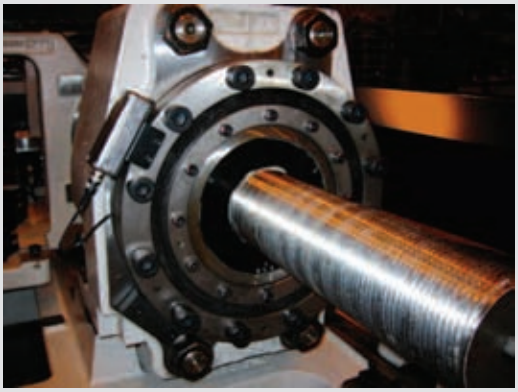




EJECT

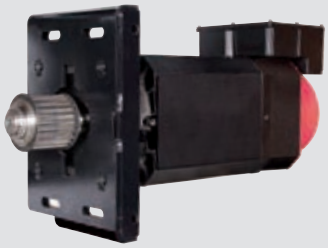
One center-acting rollerscrew provides 180° belt-pulley contact and eliminates the need for timed components. Housing is rotated which allows for higher speeds while reducing preventative maintenance. A single acting rollerscrew opens up the ejector system for easy access. Pulsating ejection and SPI knockout pattern with drilled knockout bar are shown here.

PROVEN PERFORMANCE DESIGNS



LOAD CELL

POWERLINE's Load Cell measures injection force on the rollerscrew. This industry-proven technology has been standard on Milacron machines for almost two decades. Amplifier box sends the signal to the control for readout on the operator station. Laser aligned for accuracy.



AC SERVO MOTOR

Low-inertia fan-cooled totally-enclosed AC Servo Motor with lightweight pulleys ensure smooth, rapid acceleration and deceleration capabilities. AC servo motors either drive belts or attach directly to gear box. Fan cooled motors keep servo motor temperature stable as your plant temperature or work environment fluctuates.

GULL WING DOOR

Reciprocating Screw models also feature gull wing doors in addition to sight windows over injection units for easy access and visibility during maintenance.

ROLLERSCREW

The rollerscrew design provides more points of contact and can withstand higher shockloads with high load ratings, higher acceleration rates, higher running speeds and far less maintenance. With fewer components, the rollerscrew design's simplicity increases reliability, performance and component life.

NEXT GENERATION

POWERLINE

THE SIMPLER ALL-ELECTRIC INJECTION

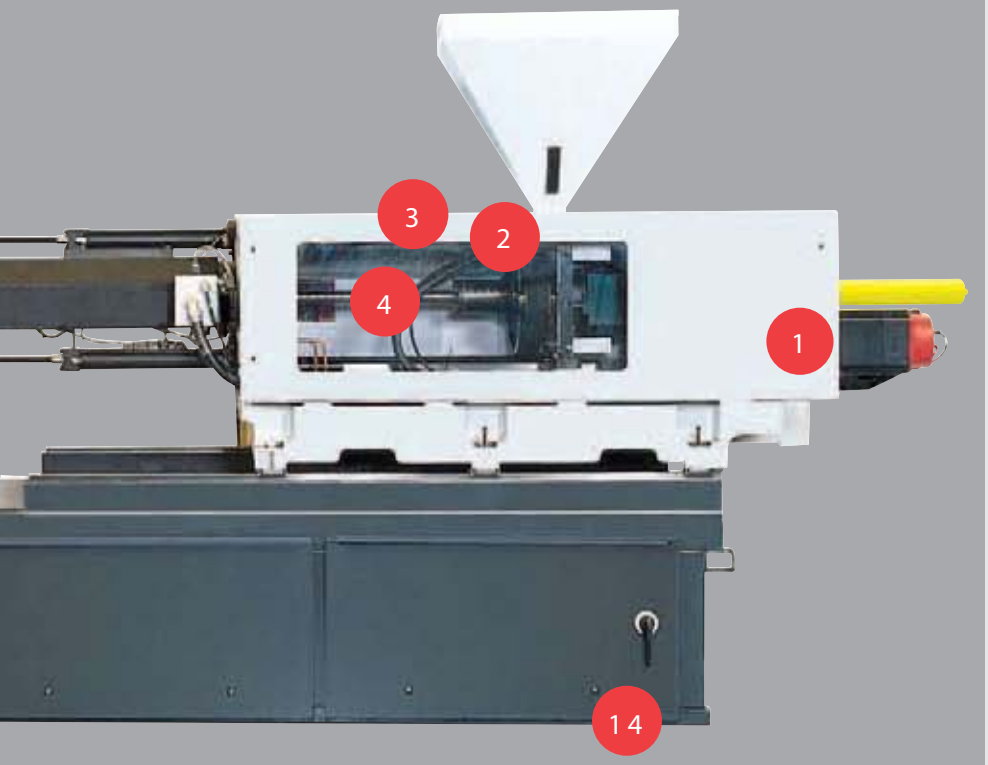
Fewer components. More durable, longer lasting components. More productive machine components. That's the new POWERLINE All-Electric by Milacron. Speed, precision, simplicity, energy savings. All in one high-performance Package.

PERFORMANCE FEATURES AND BENEFITS

1. Air cooled AC servos and drives. -0- liquid cooling. -0- water required. Means lower inertia. Increased response.
2. POWERLINE'S full process versatility features multiple injection units plus interchangeable A-B-C screw/barrel combinations.
3. SIDEWINDER 2-Stage Injection Unit available on 440 ton models and higher .
4. "Sight Window" in guarding over injection unit.
5. Advanced digital motor/drive/control.
6. MOSAIC Control. Precision Processing Control Technology for all applications.
7. MOLD GUARD proprietar y full-stroke mold protection standard on all models.
8. POWERLINE is the "bigger" smaller machine. Delivering 10% increase in tonnage. 12% reduction in floor space. 12% increase in tie bar spacing.
9. New higher speed. Ultra precision. Rack-and-Pinion clamp.

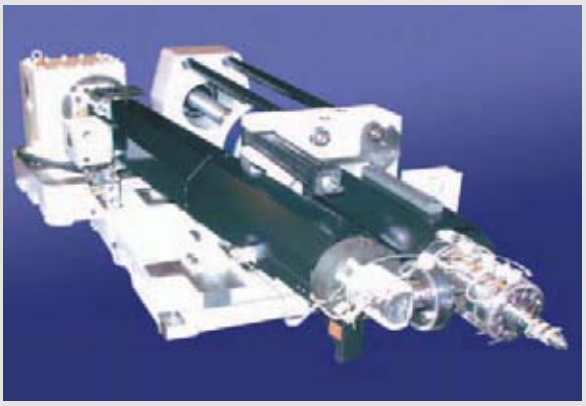
MOLDING MACHINE

POWERLINE 440, 550, 750, 935 and 1125 models available.
High-speed, high-performance bucket, container, cutlery and specialty application models also available.



10. No hydraulic systems. No hydraulic failures. No fluids to store, clean up, dispose of. No noise. Clean, green machine. With up to 90% savings in total energy usage.
11. Fully mechanical power train.
12. Exclusive roller screw injection and ejection operation.
13. Lower profile. More "user friendly" machine. Tri-directional part removal base design.
14. Double tubular steel base or sturdy I-Beam base for maximum rigidity.

SIDEWINDER
TWO-STAGE INJECTION UNIT



INCREASED CAPACITY. MAXIMUM VERSATILITY. HIGHEST MELT QUALITY.

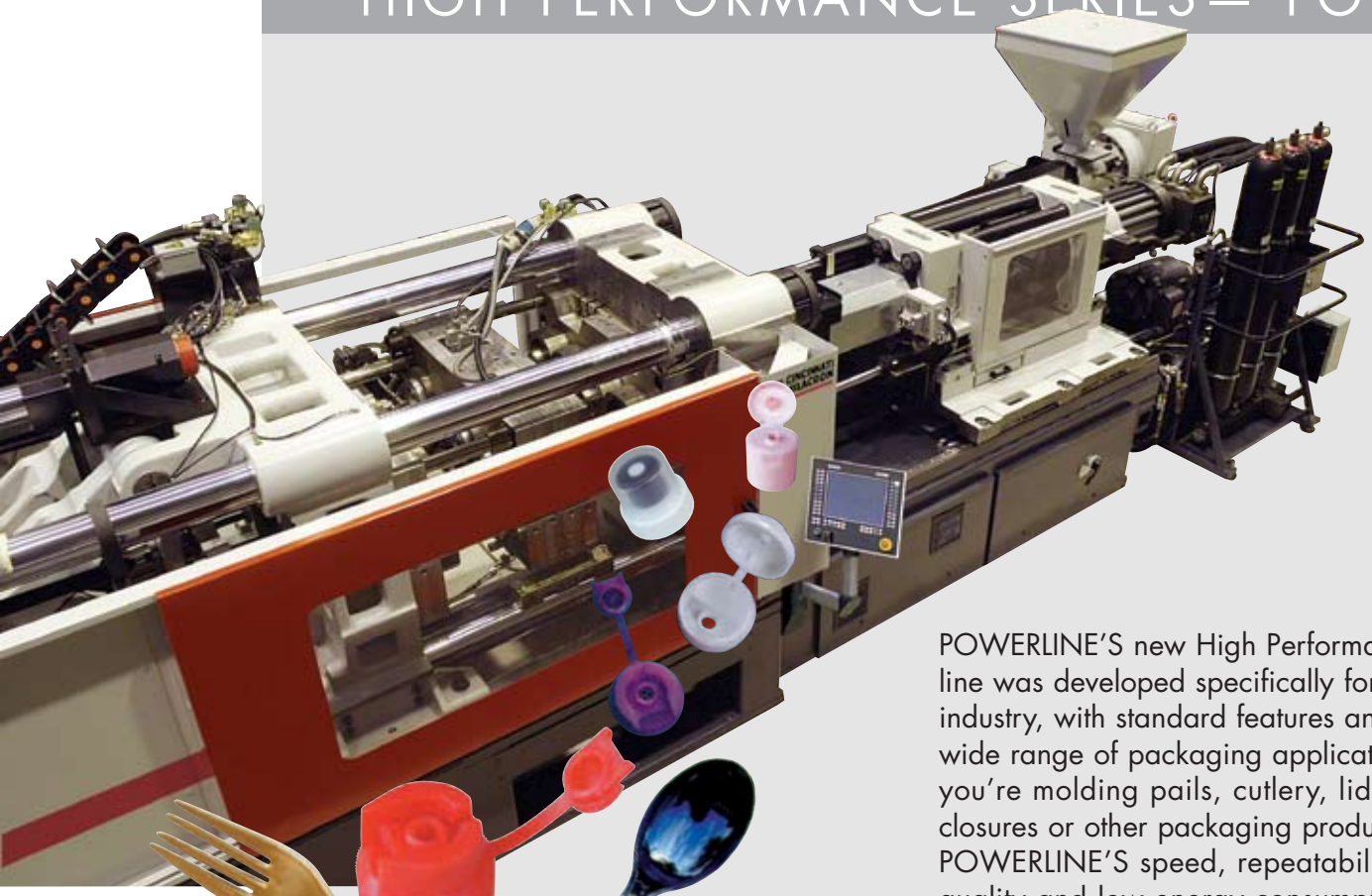
That's what you get with the SIDEWINDER Two-Stage Injection Unit. The unit is standard on POWERLINE 440 ton and higher tonnage machines—in 74, 98 and 135 oz. injection capacities. Offers very economical large-shot capability—with up to 30,000 psi pressure—again with superior melt quality. Plus precision mini-shot control down to 2% of barrel capacity. The two-stage unit also offers compounding, venting and many other advantages unique to free-standing extruders.

- First-in, first-out melt handling.
- Quick, easy color change.
- Equipped for abrasive materials.
- Precision mini-shot control down to 2-3% of barrel capacity.
- All with high throughput and high pressure.

NEXT GENERATION

POWERLINE

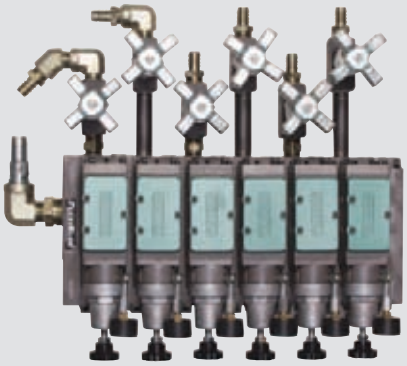
HIGH PERFORMANCE SERIES— FOR HIGH



POWERLINE'S new High Performance machine line was developed specifically for the packaging industry, with standard features and options for a wide range of packaging applications. Whether you're molding pails, cutlery, lids, containers, closures or other packaging products - you'll find POWERLINE'S speed, repeatability, high part quality and low energy consumption superior to traditional non-electric package molding. For high-speed, high-productivity packaging applications, POWERLINE offers it all.

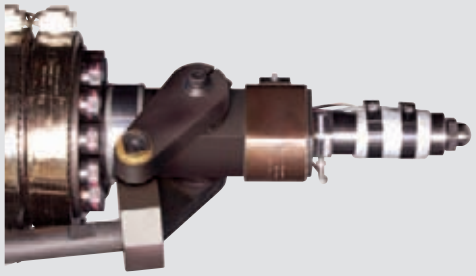
PERFORMANCE PACKAGING APPLICATIONS

POWERLINE Air Eject System air tank provides the volume of air you want for rapid, consistent air eject response. All the air you want on demand.



Multiple stage air eject is available for processes that require sequencing air circuits, direct blow-off, downward air curtain effects or other custom configurations. Air blow-off can be used in conjunction with air tank when large volumes are required.

- Tie rod supports for stack molds.
- Harmonic mold system.
- Milacron's nozzle shut-off valve rotary style with .750" I.D. matches nozzle body I.D.
- 3 to 6 stage air eject with air reservoir.
- Pull-in system produces fast sled pressure build up based on clamp position.
- Hydraulic rack circuit.
- Ultra high speed injection motor.



Nozzle shut-off valves allow for recovery during clamp-open, increasing the available overall recovery time. The rotating internal mechanism reduces pressure drop during injection while keeping the moving components at a minimum to ensure reliability during high throughput applications. Nozzle shut-off valve is pneumatically operated.

BARRIER SCREW

Part of the Sidewinder 2-Stage Injection Unit, provides faster recovery with lower melt temperatures, while providing superior color mix. Fixed screw extruder with constant L/D provides lower backpressures. Long plunger stroke means superior resolution for small shots without sacrificing capacity on larger shots.

MOSAIC Microprocesor Control

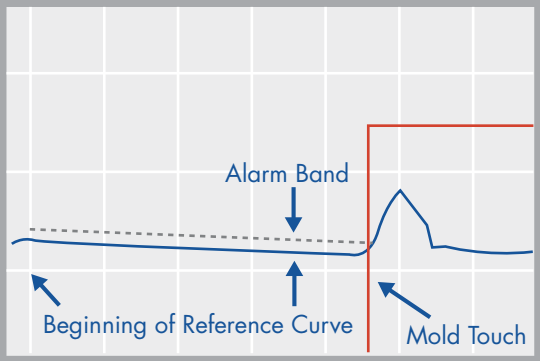
PRECISION CONTROL TECHNOLOGY FOR ALL APPLICATIONS

MOSAIC Control offers the most extensive processing capability in the industry—delivering consistent, higher quality parts processing—plus higher production capabilities including both internet and intranet connectivity.

- 15 Inch Diagonal Touch Screen TFT Flat Panel, Analog, Resistive
- Screen layouts are clear, concise and easy to understand.
- Dual Intel Processors.
- Swing Arm Mount.
- IP65 Protection (against contamination).
- Ethernet port - TCP/IP & FTP protocols.
- Direct Group Access Keys for quick machine setup.
- Pop-up keyboards for data and text entry.
- All digital position feedback for accuracy.
- Statisical Process Control (SPC).
- Volume/Position/Pressure Injection Setpoints.
- Melt or Hydraulic Pressure Transfer.
- Enhanced Plotting Graphics with Cursors.
- Freely Configurable I/O
- Built-in Web Server

MOLDGUARD

FULL STROKE MOLD PROTECTION



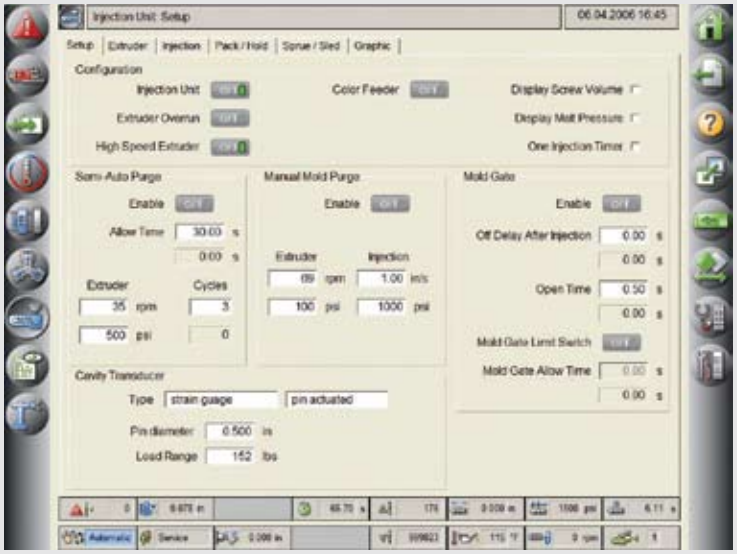
MOLDGUARD advanced protection software is a MILACRON exclusive and comes as part of the XTREEM Control package, standard with all POWERLINE machines. MOLDGUARD protects your mold from damage. Protects your mold from premature and excessive wear. Helps deliver more cycles and more quality par ts. And helps protect your largest part-producing investment next to your molding machine itself. MOLDGUARD is designed to provide full-stroke

INTUITIVE OPERATION TOUCH SCREEN

Message Bar: Displays the active alarm text or the current menu if no alarm exists

Group Access Keys

- Alarms
- Overview
- Mold Data
- Temperatures
- Clamp Unit
- Cores
- Injection
- Production
- Automation



Special Function Keys

- Home
- Page Back
- Help
- Screen Export
- Data Export Foreground/ Background Data
- Production
- System

Status Bar: The always visible Status Bar provides a quick glance at the current status of critical machine parameters, including actual feedback from sensors, current cycle count and current logged-in user.

MOSAIC

SOFTWARE

mold protection, at maximum clamp speed—in effect reducing cycle time while providing this greatly enhanced mold protection, and increasing your overall productivity as a result.

- Selectable ON/OFF .
- Adjustable alarm band for ultra fine sensitivity.
- Operator adjustable start position. Can be set for entire clamp stroke.
- Actual force readout.
- Maximum force deviation displayed with associated position to assist in setup.
- Automatically adjusts for changes in friction (mold and/or machine) and temperature.
- Standard mold protect remains active serving as a high limit.

POWERLINE

A WORD ABOUT HYBRID MACHINES

DO THEY DELIVER TRUE ALL-ELECTRIC POWER, PERFORMANCE OR ENERGY SAVINGS?

More and more "hybrid" machines have been coming into the marketplace with the claim of all-electric performance and energy savings. This is simply untrue. A hybrid machine is a machine with an electric screw drive. There is independent operation of clamp and injection functions, with 90% of all hydraulic hoses, valves and pumps still part of the machine. A simple comparison of comparable tonnage machines, hybrid and all-electric, will show the major differences:

HYBRID VS POWERLINE COMPARATOR

HYBRID 550	POWERLINE 550	PROCESSING / COST CONSIDERATIONS
12 Pulleys	4 Pulleys	
4 clamp ,4 inject ,4 eject		
7-8 Ballscrews	2 Rollerscrews	*Ballscrews must be timed and replaced on hybrid machines.*
2 clamp, 2-3 inject,1 pull-in, 2 eject	*1 rack/pinion*	
8 Motors	5 motors	
85 Power Factor	95 power factor	
Motor/Drive creates harmonics	Low harmonics	*Optional "large" filtering device required.*
Hydraulic HP does not decrease	HP decreases when not needed	*Hybrid machines waste energy. Energy is not wasted with Powerline.*

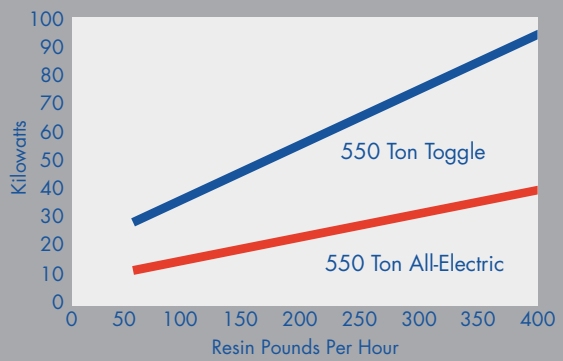
POWERLINE DELIVERS TRUE ALL-ELECTRIC POWER, PERFORMANCE AND ENERGY SAVINGS

ENERGY SAVINGS FROM POWERLINE

SAVE ON ENERGY USAGE AND COSTS

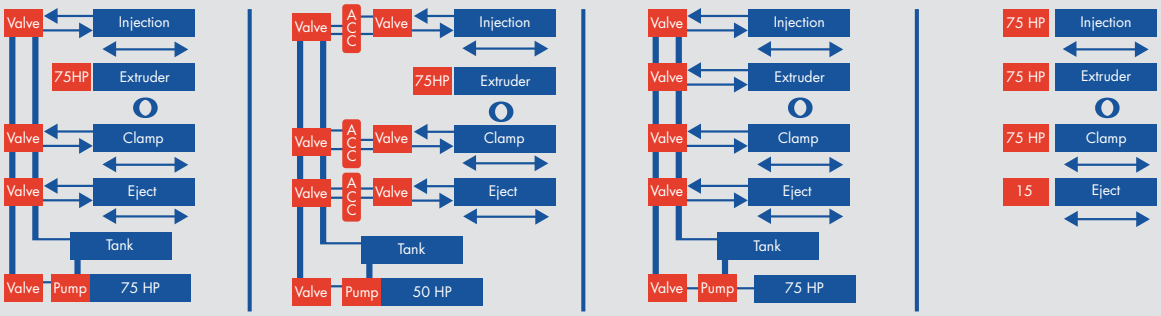
POWERLINE delivers consistent, reliable, high throughput at a fraction of the energy used by comparable tonnage machines. In fact, three POWERLINE All-Electrics can run on the same power used by one comparable hydraulic machine.

ENERGY USAGE VS THROUGHPUT



ALL-ELECTRIC INJECTION MOLDING MACHINES

PROCESS COMPARISON

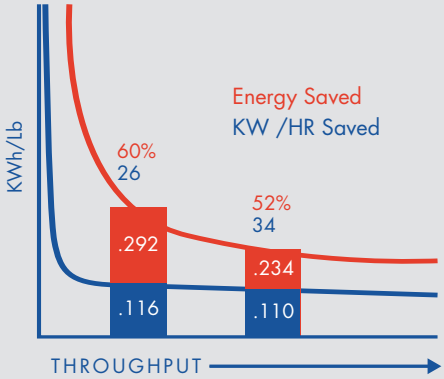


Hybrid 1 (Hydraulic Machine) | Hybrid 2 (ElectricMachine) | Hydraulic Machine | Electric Machine

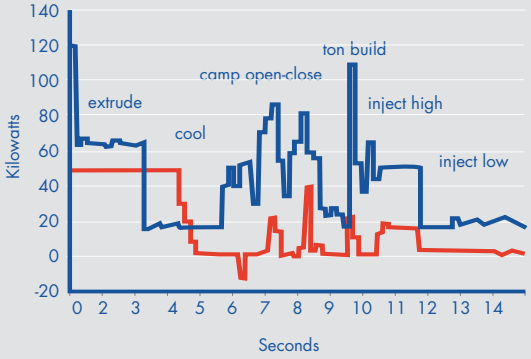
Compare the complexity of the "hybrid" and hydraulic systems to the simplicity of the all-electric system performance.

All-Electric Molding Technology Systems vs. Standard Hydraulic Machine Systems. The potential energy savings translates not only to savings in overhead costs but production costs as well.

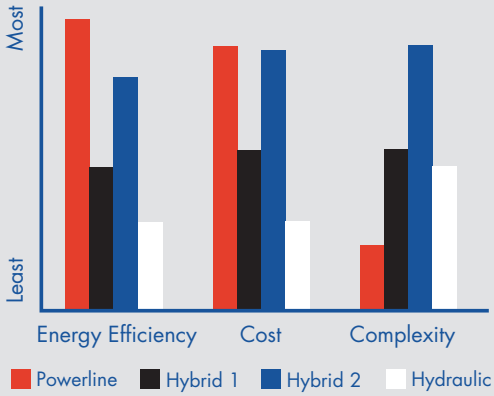
550 TON HYBRID VS. ALL-ELECTRIC



550 TON HYBRID VS. ALL-ELECTRIC

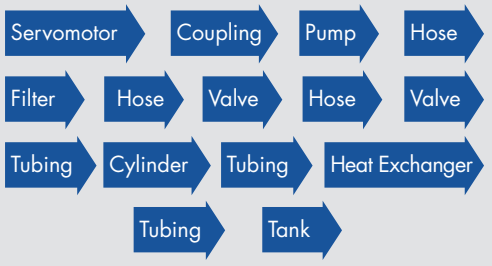


EFFICIENCY COST COMPLEXITY



DRIVE COMPLEXITY COMPARISON

Hybrid Hydraulic Drive



Electric Drive

CELEBRATING OVER 120 YEARS OF MANUFACTURING TECHNOLOGY SINCE 1884

Our No. 1 business is plastics technologies.

Our No. 1 objective is to serve your every plastics processing requirement – with the widest array of capabilities in the plastics industry today.

- All-Electric Injection Molding Machines
- 2 - Platen Injection Molding Machine
- Multi-Color/Material Injection Molding Machines
- High Technology Injection Molding Machines
- PET Pellet-To-Product Packaging Solutions
- Structural Foam/Web Gas Assist
- Vertical Insert Injection Molding Machines
- Consumer and Industrial Blow Molding Machines
- Mold Technology, Systems and Supplies
- MRO Products and Supplies
- Independent Service Provider Network
- Rebuilt and Retrofitted Machines
- Peripheral Auxiliary Equipment
- After-Sale Technology, Service and Parts
- Conical Twin Screw Extrusion Systems
- Parallel Twin Screw Extrusion Systems
- Single Screw Extrusion Systems
- Wood Fiber/Plastic Composite Extrusion Systems
- Sheet Extrusion Systems
- New and Rebuilt Extrusion Screws

All specifications reflect average values based on typical machine layouts. Actual figures will vary depending on final machine configuration.

If you require more specific data, consult a certified installation print for your particular machine. Performance specifications are based on theoretical data. Due to continual improvements, specifications are subject to change without notice.

MILACRON
Plastics Technologies

Milacron Inc. Plastics Technologies
4165 Halfacre Road Batavia, OH 45103
Tel. (513) 536-2000 Fax (513) 536-2624 www.milacron.com